Information and Communication Technology (ICT) Led Tourism Growth Nexus in Transitional Markets

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Abstract: The study investigated the impact of ICT on tourism growth in emerging markets using five panel data analysis methods (fixed effects, random effects, pooled OLS, FMOLS, dynamic GMM) with data ranging from 1996 to 2016. Majority of the theoretical and empirical literature shows that ICT has got a positive influence on tourism growth and development both in the long and short run. Although several empirical researchers have explored the subject matter, to the best of the authors' knowledge, no study so far had investigated the impact of ICT on tourism in emerging markets as a bloc of countries. Overwhelmingly majority of the panel data analysis methods (fixed effects, random effects, FMOLS and dynamic GMM) shows that ICT had a significant positive influence on tourism growth and development in line with most theoretical predictions. The study therefore urges emerging markets to develop and implement ICT policies that ensures that tourism growth and development is enhanced. Future studies should investigate the macroeconomic variables that must be available in the emerging markets in order to enhance ICT's positive influence on tourism growth and development.

Keywords: ICT; Tourism; Emerging Markets; Panel Data

JEL Classification: O3; P2

1. Introduction

The tourism industry is known world-wide to be one of the economic sectors which not only employs a lot of people but whose revenue receipts plays a significant role in economic growth of many countries (Abdulhamid et al., 2016). The positive role that tourism plays in the economy is no longer a contestable issue among academics, policymakers and economists. The theoretical propositions by Croes and Vanegas (2008), Yamakawa (2007), Kumar et al. (2015), Mathieson and Wall (1982) explain the importance of tourism sector in the economy. Empirical studies which supports the tourism led growth nexus include Kibara et al (2012), Narayan et al (2013), Chou

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(2013), Ridderstaat et al. (2014), Belloumi (2010), Tugcu (2014), Mishra et al. (2011), Cortes-Jimenez et al. (2011), among others.

The importance of tourism on economic growth means that a thorough understanding of the determinants of tourism is critical in order to be able to implement tourism policies which ultimately enhance economic growth. Despite the existence of consensus in literature on the importance of tourism on economic growth, empirical studies that have so far investigated the determinants of tourism growth are quite scant. More recent studies which found out that ICT is paramount for tourism growth were done by Assaf and Josiassen (2012), Fatimah and Pujiarto (2019), Rodriguez and Rodriguez (2018), Ilic and Nikolic (2018), Sastry and Suhil (2018), Bekteshi and Bekteshi (2017) and Wahab (2017).The finding resonates with Abdulhamid et al (2016) whose study argued that tourism is an information intensive sector.These few studies shied away from exploring the same subject matter for transitional countries as a bloc of countries which according to Cavusgil et al (2013) was the most popular international capital flow recipient during the last two decades. This study is the first of its kind to investigate the role that ICT played in enhancing tourism growth in transitional economies in a such a comprehensive manner to the best of the authors' knowledge.

What is emerging in the recent literature is that policy makers need to factor in the role of ICT in e-tourism as it is becoming one of the cheapest and most efficient way of reaching out to the global potential customers. Majority of studies so far that investigated the role of ICT on tourism growth focused on single country studies. Few which focused on a bloc of countries were done by Zaidan (2017), Berne et al. (2015), Abdulhamid et al. (2016) and Elena and Andrea (2013). They mostly used descriptive statistics and cross sectional data analysis. The current study deviates from these similar prior studies in the following ways: (1) it uses panel data analysis methods, which takes into account both time series and cross sectional data characteristics, (2) uses a dynamic GMM approach, an approach which takes cognisance of the fact that tourists are attracted to most common international tourist destinations the world over, (3) the dynamic GMM approach addresses the endogeneity problem and (4) strictly uses transitional economies a s a unit of analysis. The study will help transitional economies to develop ICT policies that stimulate tourism growth and development. Section 2 discusses the theoretical literature on the impact of ICT on tourism, Section 3 reviews the empirical literature on the influence of ICT on tourism whilst Section 4 explains how other factors apart from ICT affect tourism. Section 5 is the pre-estimation diagnostics, Section 6 is the research methodology and the summary of study is Section 7.

2. ICT and Tourism- Theoretical literature

The ICT-led tourism growth theoretical perspective has so far been supported by a number of authors (Jonathan & Tarigan, 2016; Bekteshi & Bekteshi, 2017; Benson & Standing, 2008; Standing et al., 2014; Wahab, 2017; Buhalis, 2003; Kevin & Stiroh, 2003; Buhalis & Zoge, 2007).

Jonathan and Tarigan (2016) argued that ICT promotes tourism in the following ways: (1) facilitates innovative technology based marketing (e-marketing, (2) help the tourism firms to deliver services in a cost effective way and (3) enables customers to easily access the crucial information. ICT makes it possible for tourism firms to interact with their customers thereby ensuring that they are able to satisfy their always changing expectations (Bekteshi & Bekteshi, 2017, p. 139). Following Benson and Standing (2008), ICT expanded the choice and information for the tourism industry customers. ICT development ensured that customers received their tickets through the internet and also led to the growth in the number of travel and tourism intermediaries (Standing et al., 2014, p. 82).

Wahab (2017) noted that ICT facilitates the application of E-Tourism, which involves the application of flight tracking system, dynamic packaging, computer reservation system, global distribution system, extensive mark-up language, customer relationship management, audio tours, biometric passport, virtual tour and space tourism. Buhalis (2003) also noted that ICT improves the globalization of the tourism industry by availing effective and efficient tools that helps tourism firms to distribute their services world-wide. ICT was also said to be important because of its ability to efficiently provide timely information to the tourism customers at a very low cost (Kevin & Stiroh, 2003). The same author also argued that ICT enables tourism firms to have access to a wide range of international markets. Buhalis and Zoge (2007) explained that ICT rationalize the operating costs and helps in the development of differentiated marketing strategies in the tourism industry.

3. ICT and Tourism Growth -Empirical Literature

Table 1 shows a summary of empirical research on ICT and tourism growth and development.

Table 1. Summary of Empirical Work on Infrastructure Development and Economic Growth

Author	Focal unit of analysis	Methodology	Research findings
Fatimah and Pujiarto (2019)	Indonesia	Case study approach	The study revealed that the pines tourism villages benefited a lot from ICT development, human capacity building and community empowerment programmes.
Ali et al (2013)	Maldives	Qualitative data analysis	E-commerce was found to have had a positive influence on the tourism sector of the Maldives.
Rodriguez and Rodriguez (2018)	Colombia	Descriptive statistics	The influence that ICT brought to the tourism sector of Colombia was found to be phenomenal.
Bethapudi (2013)	India	Descriptive statistics	ICT was found to have played a significant positive role in the growth and development of the Indian tourism industry.
Ilic and Nikolic (2018)	Serbia	Travel and tourism competitive index analysis	The modern technology development had a major positive influence on Serbia's tourism sector. In particular, the improvement in technology development enhanced Serbia's tourism sector competitiveness.
Sastry and Suhil (2018)	India	Descriptive analysis	Technology was found to have had increased the flexibility, efficiency and added a lot of positive value to India's tourism sector.
Jadhav and Mundhe (2011)	World wide	Literature review approach	The conclusion made was that information technology accelerate tourism growth and development in the modern day era.
Mupfiga (2015)	Zimbabwe	Descriptive statistical analysis	ICT is paramount to tourism growth in Zimbabwe because it enables the tourists (1) to cut costs by allowing them to be their own travel agent and (2) to have a personalized travel package.
Chang et al (2015)	Tanzania	Structural Equation Modelling and Confirmatory Factor Analysis	E-commerce was found to have contributed positively towards the growth of the tourism industry in Tanzania. Specifically, e-commerce enhanced the competitive position, overall business performance, customer service delivery and customer base of Tanzania's tourism sector.
Zaidan (2017)	United Arab Emirates (UAE)	Descriptive statistical analysis	The tourism sector in UAE was found to have used ICT for the following reasons, namely, boosting its international reputation, communicating with customers, attracting and retaining customers, accessing international markets and building and solidifying their competitive positions. Overally, the study noted that ICT's usage led to the accelerated growth of the tourism sector in UAE.
Berne et al (2015)	European countries	Descriptive statistical analysis	ICT led to value addition, improved product quality and facilitated the adoption of best practices in the tourism industry in Europe.
Firoiu and Croitoru (2015)	Romania	Descriptive statistics	ICT helped to spearhead the growth of the tourism sector of Romania through facilitating online marketing strategies (which are cheaper) and promoting and selling the hotels' services.
Elena and Andrea (2013)	Twenty nine European countries	Probit regression analysis	The study noted that the use of diverse ICT programs had a little impact on the productivity and competition in the tourism industry. However, ICT allowed the tourism related firms to expand

			their market share and enhanced their ability to introduce new processes.
Vukadinovic et al (2016)	World wide	Literature review approach	Overall business performance, productivity and efficiency were increased by the ICT usage in the tourism sector of
Tichaawa et al (2017)	South Africa	Descriptive statistics	ICT was found to have had the following benefits to the tourism sector in East London, South Africa. These are, (1) improved the firms' image, (2) enhanced service quality, (3) speeded up the rate of service delivery, (4) boosted the firms' market share and (5) pushed up the customer satisfaction levels.
Hossein (2013)	Iran	Autoregressive Distributive Lag (ARDL)	ICT was found to have enhanced the positive role played by the tourism sector in ensuring economic growth in Iran. The finding applies in the long run.
Wahab (2017)	World wide	Literature review approach	Information technology made travelling safer, bridged the gap between the customer and the tourism firm and also enabled timeous access to the rightful information at any given time.
Abdulhamid et al (2016)	Developing countries	Correlation analysis	ICT usage in developing countries improved the operational productivity and customer satisfaction in the hotels. Moreover, ICT was found to have had a significant positive influence on the growth and development of the tourism industry in developing countries.
Mihajlovic (2012)	Croatia	Descriptive statistics	ICT was found to have revolutionalised the manner in which travel agents operate hence enhancing the growth of the tourism industry in Croatia.
Jonathan and Tarigan (2016)	Indonesia	Multiple regression analysis	ICT was found to have led to the upward growth of Indonesia's tourism sector by 40%.
Bekteshi and Bekteshi (2017)	Albania	Descriptive statistics	The study observed that ICT expanded and improved the quality of services provided by tourism firms in Albania. Moreover, the performance of tourism linked firms improved to ICT programmes implementation.
Standing et al (2014)	World wide	Literature review approach	The ICT-led tourism and growth hypothesis was supported.

Source: Author compilation

There is consensus in both theoretical and empirical literature on the impact of ICT on the growth and development of the tourism industry. Whilst other global regions have been fairly covered in the research, the story of the influence of ICT on tourism industry in emerging markets has so far not been told. The role that human capital development plays in enhancing ICT's impact on tourism industry is also still unclear not only in the emerging markets but world-wide.

4. A Discussion of How other Factors Influence Tourism Growth and Development

Table 2. Theory Intuition and a Priori Expectation

Variable	Proxy used	Theory intuition	Expected sign
Lag of tourism ($TOURISM_{i,t-1}$)	International tourism receipts (% of GDP)	Tourists are attracted to most common international tourists destinations	+
Human capital development (HCAP)	Human capital development index	Following Esu (2012:284), human capital development positively contributes towards tourism growth and development through the following: (1) improve the quality of services provided to the customers, (2) reduce cost of doing business, (3) improve self-esteem of the workers thereby guaranteeing higher hotel guests' satisfaction and (4) increase the tourism firms' ability to satisfactorily meet the target market needs. Adeola (2016) noted that implementation of human capital development strategies was necessary to enhance the growth of the hospitality industry in Nigeria. On the other hand, Metilelu (2016) argued that human capital development does not necessarily improve the growth and development of the tourism particularly if the education and skills acquired are not related to the tourism industry.	+/-
Financial development (FIN)	Stock market capitalization (% of GDP)	Tsaurai (2018a) argued that higher levels of financial development in the tourist receiving country is beneficial because it facilitates easy access of financial products by the tourists whilst they are enjoying their holiday time. The tourists are also able to trade in financial markets while on holiday (Tsaurai, 2018, p. 101). A study by Katircioglu et al (2018) observed that financial sector development and tourism had a reinforcing influence on each other and also that financial development had a significant positive effect on tourism in the long run in Turkey. On the other hand, financial development was found to have had a significant negative influence on tourism in the short run in Turkey (Katircioglu et al., 2018, p. 533).	+/-
Foreign direct investment (FDI)	Foreign direct investment net inflows (% of GDP)	Samimi et al (2013) argued that FDI plays a very critical role in tourism sector development through availing international capital for building tourism linked infrastructure such as highways, international airports and modern technologies. Tourism related FDI and tourism were found to have a feedback effect in developing countries in the long run (Samimi et al., 2013). In the short run, the same study found that the two variables had no influence on each other. Some of the	+/-

		tourism linked FDI infrastructural development projects severely damage the environment and the ecosystem, which under normal circumstances should also be helping towards attracting tourists into the country (Samimi et al., 2013, p. 62).	
Infrastructure development (INFR)	Fixed telephone subscriptions (per 100 people)	According to Adebayo (2014), infrastructure development is a catalyst for tourism development because it increases the efficiency of production and distribution of the tourism services to the customers even those who are based in the remotest areas. Developed transport infrastructure enable customers to consume the tourism services (Jovanovic & Ilic, 2016). The authors are of the view that infrastructure such fixed telephones deter tourists' visit because of their lack of convenience, rigidity and failure to cater for the modern needs of the tourists related to internet and social media services.	+
Economic growth (GROWTH)	GDP per capita	A strong economy attracts more investments into the tourism industry (Assaf & Josiassen, 2012, p. 390). Naude and Saayman (2005) observed that economic growth provided stable macroeconomic environment which attracts not only international tourists but enables the government (through increased tax revenue base) to have enough money to support in the tourism industry.	+
Trade openness (OPEN)	Total of exports and imports (% of GDP)	According to Turner and Witt (2001) and Kozak and Rimmington (1998), trade openness increases tourism growth and development through the following channels: (1) fostering international travel and access to the tourism industry and (2) increases competition hence enabling the tourists to enjoy lower prices of goods and services. Empirical studies (Surugiu, 2011; Habibi et al., 2009; Wong & Tang. 2010) noted that higher levels of trade openness enhanced the number of international tourist arrivals.	+

Source: Author compilation

5. Pre-Estimation Diagnostics

This section consists of trend analysis, descriptive statistics and correlation analysis. Table 3 shows tourism growth and ICT trends in emerging markets during the period ranging from 1996 to 2016.

Table 3. ICT and Tourism Growth Trends for Emerging Markets (1996-2016)

	Tourism (international tourism receipts as a ratio of GDP)	ICT (individuals using internet (% of population)
Asia		
Republic of Korea	1.34	63.53
Philippines	2.38	16.72
Malaysia	6.80	42.91
India	0.87	7.02
Indonesia	2.00	7.49
Thailand	8.16	16.88
Hong Kong	8.98	53.88
Singapore	5.60	55.78
China	1.00	20.10
Africa		
South Africa	2.90	18.35
Latin America		
Peru	1.80	21.37
Mexico	1.39	22.54
Colombia	1.35	22.75
Brazil	0.32	26.97
Argentina	1.28	49.23
Europe		
Poland	2.94	38.58
Greece	5.78	31.91
Turkey	3.65	24.83
Russia	1.24	27.81
Portugal	5.64	37.62
Czech Republic	4.35	43.31
Overall mean	**3.32**	**30.93**

Source: Author compilation

From Table 3, four Asian countries (Malaysia, Thailand, Hong Kong, Singapore) had their tourism receipts higher that the overall mean of 3.32% whilst tourism receipts for the remaining Asian countries such as Republic of Korea, Philippines, India, Indonesia and China were lower than the overall mean. Malaysia, India, Thailand, Hong Kong, and Singapore were the outliers because their mean tourism receipts deviated by a wider margin from the overall mean of 3.32%. South Africa's mean tourism receipt of 2.90% is closer to the overall mean of 3.32%.

The mean tourism receipts for Peru, Mexico, Colombia, Brazil and Argentina (Latin American countries) were 1.80%, 1.39%, 1.35%, 0.32% and 1.28% respectively. All the Latin American countries' mean tourism receipts did not deviate much from the

overall mean of 3.32%. The mean tourism receipts for four European countries [Greece (5.78%), Turkey (3.65%), Portugal (5.64%), Czech Republic (4.35%)] is higher than the overall mean of 3.32% whilst mean tourism receipts for the remaining European countries (Poland, Russia) were lower than the overall mean of 3.32%.Greece, Russia and Portugal are the outliers because their mean tourism receipts deviated from the overall mean tourism receipts of 3.32% by a wider margin.

With regards to ICT, Asian countries such as Republic of Korea, Malaysia, Hong Kong and Singapore had their mean ICT growth above the overall mean ICT growth of 30.93% of the population. Only two Asian countries (Philippines and Thailand) had their mean ICT growth which was closer to the overall mean ICT growth of 30.93% of the population. All the other Asian countries (Republic of Korea, Malaysia, India, Indonesia, Hong Kong, Singapore, China) are outliers because their mean ICT growth are far away from the overall mean ICT growth of 30.93% of the population. Even South Africa whose mean ICT growth over a period ranging from 1996 to 2016 is also an outlier because of the same reason alluded earlier on.

The only Latin American country whose mean ICT growth during the period under study was above the overall mean is Argentina (49.23% of the population). Argentina is also an outlier because of the huge difference between its mean ICT growth and the overall mean ICT growth. On the other hand, the mean ICT growth of only two European countries [Turkey (24.83% of the population), Russia (27.81% of the population)] studied was found to be lower than the overall mean ICT growth of 30.93% of the population. Among European countries studied, Czech Republic is the only outlier.

Table 4 shows the correlation analysis results, where tourism growth is the dependent variable whilst the independent variables includes ICT, human capital development, financial development, foreign direct investment, infrastructural development, economic growth and trade openness.

Table 4. Correlation analysis

	TOURISM	ICT	HCAP	FIN	FDI	INFR	GROWTH	OPEN
TOURISM	1.00							
ICT	0.24***	1.00						
HCAP	0.38***	0.50***	1.00					
FIN	0.57***	0.31***	0.24***	1.00				
FDI	0.53***	0.33***	0.38***	0.81***	1.00			
INFR	0.40***	0.45***	0.78***	0.41***	0.45***	1.00		
GROWTH	0.48***	0.67***	0.69***	0.51***	0.65***	0.75***	1.00	
OPEN	0.67***	0.38***	0.46***	0.72***	0.80***	0.48***	0.71***	1.00

Source: E-Views results

Consistent with theoretical literature (see Section 2 and 3 and Table 2), all the independent variables (ICT, HCAP, FIN, FDI, INFR, GROWTH, OPEN) were

individually and separately correlated with the dependent variable (TOURISM) in a significant positive manner. The maximum correlation size is 0.81 (between FDI and financial development), evidence that there is no problem of multicollinearity, consistent with Stead (1996).

The results from Table 5 shows two undesirable characteristics of the data being used. Firstly, the standard deviation for financial development and economic growth data is too high, evidence that there exist extreme or abnormal values in these variables. The data for all the variables are not normally distributed because the probability of the Jarque-Bera criterion is zero, consistent with Tsaurai (2018b).

Table 5. Descriptive statistics

	TOURISM	ICT	HCAP	FIN	FDI	INFR	GROWTH	OPEN
Mean	3.32	30.93	0.78	92.12	4.34	23.66	10 355	95.05
Median	2.25	25.00	0.78	40.12	2.56	19.71	6 640	59.33
Maximum	15.81	92.84	0.94	1 254	58.52	62.09	56 284	455.28
Minimum	0.09	0.01	0.48	5.33	0.03	1.49	408.24	15.64
Standard. deviation	2.75	26.48	0.09	169.23	6.65	16.52	10 438	95.83
Skewness	1.46	0.51	-0.36	4.71	3.98	0.74	1.88	2.27
Kurtosis	5.50	1.99	2.75	27.35	22.05	2.50	7.07	7.33
Jarque-Bera	271.61	37.62	11.54	12 527	7 831	44.75	563.44	724.91
Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Observations	441	441	441	441	441	441	441	441

Source: E-Views results

If these two problems are not addressed, they lead to spurious results outcome (Aye & Edoja, 2017). The current study resolved these problems by converting all the data into natural logarithms before using it for further empirical tests, consistent with Aye and Edoja (2017, p. 10).

6. Research Methodology

6.1. Data

Annual data ranging from 1996 to 2016 was used in this study. The data was extracted from internationally reputable databases such as World Development Indicators, International Financial Statistics, United Nations Development Programme Various reports on human capital development index and Africa Development Indicators. The list of transitional economies which forms part of this study are given in Table 3.

6.2. Econometric Model Specifications

$$TOURISM_{i,t} = \beta_0 + \beta_1 ICT_{i,t} + \beta_2 HCAP_{i,t} + \beta_3 FIN + \beta_4 FDI_{i,t} + \beta_5 INFR_{i,t} + \beta_6 GROWTH_{i,t} + \beta_7 OPEN_{i,t} + \mu + \varepsilon \quad [1]$$

$$TOURISM_{i,t} = \beta_0 + \beta_1 TOURISM_{i,t-1} + \beta_2 ICT_{i,t} + \beta_3 HCAP_{i,t} + \beta_4 FIN + \beta_5 FDI_{i,t} + \beta_6 INFR_{i,t} + \beta_7 GROWTH_{i,t} + \beta_8 OPEN_{i,t} + \mu + \varepsilon \quad [2]$$

Equation 1 was estimated using fixed effects, random effects, pooled OLS and the FMOLS approaches whilst equation 2 was estimated using the Arellano and Bond's (1991) dynamic GMM method (see Table 8 for results).

Table 6. Panel Stationarity Tests

Level					
	Variable	LLC	IPS	ADF	PP
Individual intercept and trend	LTOURISM	-1.21 (0.11)	0.37(0.65)	39.01(0.60)	35.69(0.74)
Individual intercept and trend	LICT	-11.25***(0.00)	-8.08***(0.00)	153.72***(0.00)	426.79***(0.01)
Individual intercept and trend	LHCAP	-9.15***(0.00)	-5.30***(0.00)	96.60***(0.00)	149.24***(0.01)
Individual intercept and trend	LFIN	-3.98***(0.00)	-3.14***(0.00)	79.12***(0.00)	403.75***(0.01)
Individual intercept and trend	LFDI	-7.17***(0.00)	-5.75***(0.00)	110.95***(0.00)	172.87***(0.01)
Individual intercept and trend	LINFR	-2.31**(0.00)	0.74 (0.77)	54.37*(0.09)	80.43***(0.00)
Individual intercept and trend	LGROWTH	-0.65 (0.26)	-0.56 (0.29)	49.88 (0.19)	29.87 (0.92)
Individual intercept and trend	LOPEN	-3.24*** (0.00)	-1.71** (0.04)	80.86*** (0.00)	60.29** (0.03)
First difference					
	Variable	LLC	IPS	ADF	PP
Individual intercept and trend	LTOURISM	-7.37***(0.00)	-6.98***(0.00)	125.33***(0.00)	205.17***(0.00)
Individual intercept and trend	LICT	-6.18***(0.00)	-5.49***(0.00)	103***(0.00)	156.73***(0.00)
Individual intercept and trend	LHCAP	-14.81***(0.00)	-13.23***(0.00)	219.31***(0.00)	449.52***(0.01)

Individual intercept and trend	LFIN	-11.57***(0.00)	-12.68***(0.00)	210.95***(0.00)	384.54***(0.01)
Individual intercept and trend	LFDI	-10.89***(0.00)	-11.53***(0.00)	192.47***(0.00)	326.80***(0.01)
Individual intercept and trend	LINFR	-3.71***(0.00)	-2.50***(0.00)	69.35***(0.00)	115.28***(0.00)
Individual intercept and trend	LGROWTH	-8.55***(0.00)	-4.42***(0.00)	96.51***(0.00)	114.798***(0.00)
Individual intercept and trend	LOPEN	-9.92*** (0.00)	-7.46*** (0.00)	130.32*** (0.00)	259.69*** (0.00)

Source: Author's Compilation from E-Views

Note: LLC, IPS, ADF and PP stands for Levin, Lin and Chu (2002); Im, Pesaran and Shin (2003); ADF Fisher Chi Square and PP Fisher Chi Square tests respectively. *, ** and *** denote 1%, 5% and 10% levels of significance, respectively.

Table 7. Johansen Fisher Panel Co-integration test

Hypothesised No. of CE(s)	Fisher Statistic (from trace test)	Probability	Fisher Statistic (from max-eigen test)	Probability
None	29.11	0.9342	29.11	0.9342
At most 1	29.11	0.9342	29.11	0.9342
At most 2	22.18	0.9949	114.3	0.0000
At most 3	2.77	1.0000	352.8	0.0000
At most 4	0.00	1.0000	386.8	0.0000
At most 5	386.8	0.0000	386.8	0.0000
At most 6	278.4	0.0000	229.9	0.0000
At most 7	137.0	0.0000	137.0	0.0000

Source: Author's compilation from E-Views

Table 8. Panel data analysis results

	Fixed effects	Random effects	Pooled OLS	Fully modified OLS (FMOLS)	Dynamic GMM
$TOURISM_{i,t-1}$	-	-	-	-	0.9658***
ICT	0.0503***	0.0338***	-0.0588**	0.0569**	0.0126**
HCAP	-0.2848	-0.1225	-0.0309	-0.4903	0.2062
FIN	0.0249	0.0128	-0.1371***	0.0404	0.0076
FDI	0.0382**	0.0348**	-0.1550***	0.0696***	-0.0066
INFR	-0.2440***	-0.1858***	0.0208	-0.2713***	0.0187
GROWTH	-0.3357***	-0.2886***	0.0842	-0.3606***	0.0052
OPEN	0.5966***	0.6703***	1.1107***	0.6013***	0.0293
Number of countries	21	21	21	21	21
Number of observations	441	441	441	441	441
Adjusted R-squared	0.9392	0.5628	0.5847	0.9435	0.9719
F-statistic	252.54	39.43	89.49	-	J-static = 432
Prob (F-statistic)	0.00	0.00	0.00	-	Prob (J-statistic) =0.00

Source: Author's compilation from E-Views

***, ** and * denote 1%, 5% and 10% levels of significance, respectively.

Using the dynamic GMM approach, the lag of tourism was found to have a significant influence on tourism in emerging markets, consistent with an argument that tourists prefer to visit the most popular tourist destinations world-wide. Consistent with theory (Benson & Standing, 2008; Standing et al., 2014; Bekteshi & Bekteshi, 2017; Jonathan & Tarigan, 2016; Wahab, 2017; Buhalis, 2003), ICT was found to have had a significant positive influence on tourism growth under the fixed effects, random effects, FMOLS and the dynamic GMM. Contrary to the literature available, the pooled OLS approach noted that ICT had a significant negative effect on tourism growth in emerging markets. The possible reason could be that certain macroeconomic variables which enhances ICT's positive impact on tourism growth were not available in emerging markets, itself, a possible area for future research.

A non-significant negative relationship running from human capital development towards tourism growth was detected across all the five panel data analysis methods used. The finding resonates with Metilelu (2016) whose study argued that human capital development does not necessarily improve the growth and development of the tourism particularly if the education and skills acquired are not related to the tourism industry. Financial development had a non-significant positive influence on tourism growth under four panel estimation methods (fixed effects, random effects, FMOLS, dynamic GMM). The finding is in line with Tsaurai (2018a) whose study argued that higher levels of financial development enables tourists to easily have access to financial products whilst they are on holiday. Pooled OLS produced results which show that financial development had a significant negative impact on tourism in emerging markets, consistent with Katircioglu et al's (2018) finding that financial development had a significant negative influence on tourism in the short run in Turkey.

Under fixed effects, random effects and FMOLS, a significant positive relationship was observed running from FDI towards tourism growth in emerging markets, consistent with Samimi et al's (2013) argument that FDI boosts tourism through availing international capital for building tourism linked infrastructure such as highways, international airports and modern technologies. Pooled OLS produced results which shows that FDI had a significant negative influence on tourism whilst under dynamic GMM, a non-significant negative relationship running from FDI towards tourism was observed. The findings resonate with Samimi et al (2013, p. 62) whose study argued that some of the tourism linked FDI infrastructural development projects severely damage the environment and the ecosystem hence turning away some of the tourists.

Contrary to the literature available, both infrastructure development and economic growth separately and individually were found to have had a significant negative

impact on tourism under the fixed effects, random effects and the FMOLS. The results could be an indication that certain macroeconomic variables should be available in the tourist receiving country before infrastructure development and economic growth could have a positive influence on tourism growth and development. Supported by literature, pooled OLS and dynamic GMM show a non-significant positive relationship separately running from both economic growth and infrastructural development towards tourism growth (see Table 2). Trade openness was found to have had a significant positive impact on tourism growth under the fixed effects, random effects, pooled OLS and FMOLS, a finding which is consistent with Turner and Witt's (2001) argument that trade openness increases tourism growth and development through fostering international travel and access to the tourism industry. The dynamic GMM results show that tourism was positively but non-significantly affected by trade openness, a finding which also agrees with other prior empirical studies (Wong & Tang, 2010; Habibi et al., 2009).

7. Conclusion

The study investigated the impact of ICT on tourism growth in emerging markets using five panel data analysis methods (fixed effects, random effects, pooled OLS, FMOLS, dynamic GMM) with data ranging from 1996 to 2016. Majority of the theoretical and empirical literature shows that ICT has got a positive influence on tourism growth and development both in the long and short run. Although several empirical researchers have explored the subject matter, to the best of the authors' knowledge, no study so far had investigated the impact of ICT on tourism in emerging markets as a bloc of countries. Overwhelmingly majority of the panel data analysis methods (fixed effects, random effects, FMOLS and dynamic GMM) shows that ICT had a significant positive influence on tourism growth and development in line with most theoretical predictions. The study therefore urges emerging markets to develop and implement ICT policies that ensures that tourism growth and development is enhanced. Future studies should investigate the macroeconomic variables that must be available in the emerging markets in order to enhance ICT's positive influence on tourism growth and development.

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